

Claim Rejections - 35 U.S.C. 102/103

Claims 1-17 are rejected under 35 U.S.C. 102 as anticipated by or, in the alternative, under 35 U.S.C. 103 as obvious over Kawazura et al.

Applicants respectfully disagree. The present invention in a preferred embodiment is concerned with a rubber composition comprising (i) an incompatible polymer blend comprising at least two diene-based rubbers selected from the group consisting of rubbers containing at least one conjugated diene monomer and, optionally, at least one aromatic vinyl monomer and forming two polymer phases (A) and (B) and (ii) 0.1 to 20 parts by weight, based upon 100 parts by weight of the total polymer component including the block copolymer, of block copolymer having at least two mutually incompatible blocks (a) and (b), in which the block (a) is compatible with the polymer phase (A) and incompatible with the polymer phase (B) and the block (b) is compatible with the polymer phase (B) and incompatible with the polymer phase (A), and comprising at least one conjugated diene monomer and, optionally, at least one aromatic vinyl monomer and (iii) 5 to 200 parts by weight, based upon 100 parts by weight of the block copolymer, of at least one polymer selected from the group consisting of a polymer (α) compatible with the block (a) and the polymer phase (A), a polymer (β) compatible with the block (b) and polymer phase (B) and a mixture of the polymer (α) and the polymer (β), wherein the weight average molecular weights of the polymers (α) and (β) satisfy the following equations (III) and (IV):

$$Mw(\alpha)/Mw(a) \leq 1.2 \quad (III)$$

$$Mw(\beta)/Mw(b) \leq 1.2 \quad (IV)$$

wherein $Mw(\alpha)$: weight average molecular weight of polymer (α),

$Mw(\beta)$: weight average molecular weight of polymer (β),

$Mw(a)$: weight average molecular weight of block (a) of block copolymer, and

$Mw(b)$: weight average molecular weight of block (b) of block copolymer.

(See e.g., claim 8).

That is, the present invention in a certain embodiment is concerned with a multi-component rubber composition of (i) an incompatible polymer blend of the two or more diene rubbers forming two incompatible polymer phases (A) and (B) and (ii) 0.1 - 20 parts by weight, based upon 100 parts by weight of the total polymer component, of block copolymer having two or more incompatible blocks (a) and (b), and (iii) 5 to 200 parts by weight, based upon 100 parts by weight of the block copolymer, of the polymer (α) and/or the polymer (β) satisfying the equations (III) and (IV). No such invention is taught or suggested in the prior art.

Applicants submit in particular that no such invention is taught or suggested by any combination of cited references. Applicants urge that Kawazura et al. neither teaches nor suggests any invention as claimed. Kawazura et al. in particular fails to teach or suggest the amount of the polymer (α) and/or polymer (β), as claimed. That is, the reference contains absolutely no teaching or suggestion with respect to 5 to 200 parts by weight, based upon 100 parts by weight of the block copolymer, of a polymer (α) and/or the polymer (β). Applicants wish to make clear that through the use of such polymers (α) and/or (β), as claimed, the unexpected but advantageous effects of the present invention may be obtained, even where the polymer phases (A) and (B) of the two or more diene

rubbers do not satisfy the relationship defined by the equations (I) and/or (II) (See page 7, lines 31-34 of the English text). In other words, it is through the polymers (α) and/or (β) as claimed that the unexpected advantages with respect to adhesive resistance and tensile strength can be obtained, as demonstrated in the Examples throughout the application. Applicants again urge that any such invention is quite absent from the disclosure of Kawazura et al. Applicants further note that Campbell et al. (U.S. Patent No. 4,221,681) is unable to cure any deficiencies of Kawazura et al., in that the reference is cited merely for the alleged disclosure that natural and unsaturated synthetic polymers generally have a molecular weight of 70,000 to 300,000. Therefore, in that the cited references are unable to teach or suggest the polymer (α) and/or polymer (β) and the amounts claimed, much less the unexpected advantages obtainable through the use of such polymers, Applicants urge withdrawal of the rejections.

Applicants further note that in another preferred embodiment, the present invention is concerned with a rubber composition comprising (I) 100 parts by weight of a block copolymer having at least two mutually incompatible blocks (a) and (b) and composed of at least one conjugated diene monomer and, optionally, at least one aromatic vinyl monomer and (II) 5 to 200 parts by weight of (i) a polymer (α) compatible with the block (a), (ii) a polymer (β) compatible with the block (b) or (iii) a mixture of the polymer (α) and the polymer (β), wherein the weight average molecular weights of the polymers (α) and (β) satisfy the following equations (III) and (IV):

$$Mw(\alpha) / Mw(a) \leq 1.2 \quad (III)$$

$$Mw(\beta) / Mw(b) \leq 1.2 \quad (IV)$$

wherein $Mw(\alpha)$: weight average molecular weight of polymer (α),

$Mw(\beta)$: weight average molecular weight of polymer (β),

$Mw(a)$: weight average molecular weight of block (a) of block copolymer, and

$Mw(b)$: weight average molecular weight of block (b) of block copolymer.

(See e.g., claim 14).

That is, the present invention in such embodiment is concerned with a rubber composition comprising (I) 100 parts by weight of block copolymer having two or more mutually incompatible blocks (a) and (b), and (II) 5 to 200 parts by weight of (i) polymer (α) and/or (ii) polymer (β), satisfying the equations (III) and (IV). For purposed of clarity, Applicants point out that this embodiment of the present invention is different from the previous embodiment, discussed above, in that the component (i), an incompatible polymer blend comprising the at least two or more diene rubbers, as claimed, and forming two incompatible polymer phases (A) and (B), is not specifically included.


More important, however, Applicants note that this embodiment of the present invention can be distinguished from Kawazura et al., by at least the amount of block copolymer in the total polymer of the rubber composition, as claimed. With reference to the claims, Applicants point out in particular that the amount of block copolymer in the total amount of polymer can be demonstrated as follows: $[100/(100 + 5)] \times 100$ to $(100/(100 + 200)) \times 100 = \text{about } 95.2 \text{ to } 33.3\% \text{ by weight (i.e., } \underline{\text{about } 33.3 \text{ to } 95.2 \text{ parts by weight per } 100 \text{ parts by weight of total polymer)}})$. Applicants emphasize that such an amount of block copolymer in the total polymer amount of the rubber composition, as claimed, is quite different as compared to the amount of A-B block copolymer taught by Kawazura et al.,

which is an amount of 0.5 to 20 parts by weight per 100 parts by weight of the total polymer. Campbell et al. of course is unable to cure such deficiencies of Kawazura et al., as discussed above. Accordingly, in that the cited references are unable to teach or suggest each and every element of the claimed invention, Applicants urge withdrawal of all rejections.

In view of the amendments and remarks above, Applicants submit that this application is in condition for allowance and request favorable action thereon.

In the event this paper is not considered to be timely filed, Applicants hereby petition for an appropriate extension of time. The fee for this extension may be charged to our Deposit Account No. 01-2300. The Commissioner is hereby authorized to charge any fee deficiency or credit any overpayment associated with this communication to Deposit Account No. 01-2300, referencing Attorney Docket No. 100021-09056.

Respectfully submitted,
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Enclosure: Marked-Up Copy of Claim Amendments

MARKED-UP COPY OF CLAIM AMENDMENTS

14 (Twice Amended). A rubber composition comprising (I) 100 parts by weight of a block copolymer having at least two mutually incompatible blocks (a) and (b) and composed of at least one conjugated diene monomer and, optionally, at least one aromatic vinyl monomer and (II) 5 to 200 parts by weight of (i) a polymer (α) compatible with the block (a), (ii) a polymer (β) compatible with the block (b) or (iii) a mixture of the polymer (α) and the polymer (β), wherein the weight average molecular weights of the polymers (α) and (β) satisfy the following equations (III) and (IV):

$$Mw(\alpha) / Mw(a) [\leq] \leq 1.2 \quad (III)$$

$$Mw(\beta) / Mw(b) [\leq] \leq 1.2 \quad (IV)$$

wherein $Mw(\alpha)$: weight average molecular weight of polymer (α),

$Mw(\beta)$: weight average molecular weight of polymer (β),

$Mw(a)$: weight average molecular weight of block (a) of block copolymer, and

$Mw(b)$: weight average molecular weight of block (b) of block copolymer.